(11) Japanese Unexamined Patent Application Publication No. 4-280294

(43) Publication Date: October 6, 1992

(21) Application No. 3-67621

(22) Application Date: March 8, 1991

(71) Applicant: Hitachi Ltd.

(72) Inventor: SAITO et al.

(74) Agent: Patent Attorney, Akio NAMIKI

(54) [Title of the Invention] POINTER INDICATING DEVICE

(57) [Abstract]

[Object] To display a plurality of pointers on a screen, and to independently operate the respective pointers.

[Construction] Pointer generating circuits 74a, 74b and 74c generate pointers 73a, 73b and 73c, respectively, in one to one correspondence. For example, in a case when an order code is given from a remote controller 10a, only the pointer generating circuit 74a receives it and moves the corresponding pointer 73a. The pointers 73b and 73c do not move and remain fixed to the right and lower point of a screen as an initial state, since the pointer generating circuits 74b and 74c do not receive the order code from the remote controller 10a.

[Claims]

[Claim 1] A pointer indicating device comprising a plurality of pointer generating means which generate a plurality of pointers in one to one correspondence, indicate the pointers on a screen, and move the corresponding pointer on the screen according to the input operation signal, a plurality of operation signal generating means which are provided one to one correspondence to the plurality of pointers, and generate the operation signal so as to move the corresponding pointer on the screen, and an input means which inputs the operation signal generated by the plurality of operation signal generating means in the pointer generating means corresponding to the same pointer as the corresponding generated pointer of the operation signal generating means, in an image display device capable of indicating a plurality of pointers to respectively indicate one point on the screen on the screen with a desired image displayed thereon in an overlapping manner on the image, wherein the plurality of pointers can be independently moved.

[Claim 2] A pointer indicating device comprising a plurality of pointer generating means which generate a plurality of pointers in one to one correspondence, indicate the pointers on a screen, and move the corresponding pointer on the screen according to the input operation signal, a single or a plurality of operation signal generating means

which select the pointer designated among the plurality of pointers, and generate the operation signal so as to move the selected pointer on the screen, and an input means which inputs the operation signal generated by the operation signal generating means in a pointer generating means corresponding to the same pointer as the pointer selected by the operation signal generating means, in an image display device capable of indicating a plurality of pointers to respectively indicate one point on the screen on the screen with a desired image displayed thereon in an overlapping manner on the image, wherein the plurality of pointers can be independently moved.

[Claim 3] The pointer indicating device according to Claim 1 or Claim 2, wherein the plurality of pointer generating means generate pointers having colors or shapes different from each other for the pointers to be generated, and indicate the pointers on the screen to identify the plurality of pointers on the screen.

[Claim 4] The pointer indicating device according to any one of Claims 1, 2 and 3, comprising an input detection means to detect the input of the operation signal in the plurality of pointer generating means, and an input prohibition means to prohibit the input of the operation signal from the input means to other pointer generating means when the operation signal is input from the input

means in any one pointer generating means out of the plurality of pointer generating means as a result of detection by the input detection means, wherein two or more pointers out of the plurality of pointers cannot be moved simultaneously on the screen.

[Claim 5] The pointer indicating device according to any one of Claims 1, 2 and 3, comprising an input detection means to detect the input of the operation signal to the plurality of pointer generating means, and a control means which controls other pointer generating means when the operation signal is input by the input means in any one of the pointer generating means out of the plurality of pointer generating means as a result of detection by the input detection means, and prevents generation of the pointers to be generated or changes the color or the shape of the pointer to be generated in the pointer generating means.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention] The present invention relates to a pointer indicating device to indicate a position pointer cursor (hereinafter, referred to as a pointer) to indicate the specified position in a displayed image when image information is reproduced and displayed in an image display device.

[0002]

[Description of the Related Art] There has been provided an image display device to record the digital image data taken in by a camera, an image scanner or the like in an external storage device such as an optical disk, and to retrieve and display the data as necessary. In such a device, when a specified point on a screen must be indicated, for example, as disclosed in Japanese Unexamined Patent Application Publication No. 62-152076, a pointer which is freely movable on the screen is indicated, operated and instructed by using an input device such as a keyboard and a mouse.

[0003]

[Problems to be Solved by the Invention] The above-described image display device is not only used for a simple display device, but also used for a so-called presentation system to successively display the images in the predetermined order at a presentation, or for a so-called TV conference system to hold a conference by exchanging the images between the device and the transmitting destination through a transmission passage as an application.

[0004] In such cases, a plurality of persons may exchange their views on, for example, one screen (one image), and only one pointer is available to indicate the specified point on the screen. Then, one pointer is moved on the screen more than required, which is most inconvenient for the persons participated in the conference and the operators

to operate the pointer.

[0005] An object of the present invention is to provide a pointer indicating device capable of solving problems in the conventional technology, indicating a plurality of pointers on the screen, and operating each pointer independently.

[0006]

[Means for Solving the Problems] In order to achieve the above-described object, the present invention comprises a plurality of pointer generating means which generate a plurality of pointers in one to one correspondence, indicate them on a screen, and moves the corresponding pointer on the screen according to the input operation signal, a plurality of operation signal generating means to generate the operation signal respectively so as to move the corresponding pointer on the screen in one to one correspondence to the plurality of pointers, and an input means to input the operation signal generated by the plurality of operation signal generating means in the pointer generating means corresponding to the same pointer as the corresponding pointer of the operation signal generating means to generate the operation signal.

[0007]

[Operation] The plurality of pointer generating means generate a plurality of pointers in one to one correspondence, and indicate them on the screen. The

plurality of operation signal generating means also correspond to the plurality of pointers in one to one correspondence, and generate the operation signals, respectively, so as to move the corresponding pointer on the screen. The input means inputs the operation signal generated by the operation signal generating means in the pointer generating means corresponding the same pointer as the corresponding pointer of the operation signal generating means. Thus, a plurality of pointers are indicated on the screen, and each pointer can be operated independently. Thus, at the presentation, the TV conference or the like with a plurality of persons participating therein, the presentation, the TV conference or the like can be advanced while each person has his own operation signal generating means, and uses his own pointer, and smooth advancement can be expected.

[0008]

[Embodiment] Hereinafter, the embodiments of the present invention will be described with reference to the drawings. Fig. 1 is a block diagram to show an image display device having a pointer indicating device as a first embodiment of the present invention. The image display device is used for a presentation system to perform the presentation before a plurality of persons in a conference or the like.

[0009] In Fig. 1, reference numeral 1 denotes a CPU to

control and manage the system, reference numeral 2 denotes a main memory for the to CPU 1 to store the data temporarily, reference numeral 3 denotes a ROM to store the software to operate the system, reference numeral 4 denotes an optical disk device to store images, reference numeral 5 denotes a system bus to receive/deliver the control order, the image data or the like from the CPU 1 between the devices, reference numeral 6 denotes a compression-expansion circuit to compress the image data during the recording mode and to expand the image data during the reproducing mode, reference numeral 7 denotes a frame memory to store the image data for display, reference numeral 8 denotes a display to display the images of the frame memory 7, reference numeral 9 denotes a reception circuit to receive the data transmitted by a remote control device of an operator (hereinafter, explained as a remote controller as a specific example) and convert the data into a code to be analyzed by the CPU 1, reference numerals 10a, 10b and 10c denote remote controllers to give an order to the presentation system by the operator, and a case in which three operators give an order to the system is described.

[0010] In practice, there are processes of preparing the image data to form the materials for presentation in advance, and of recording the image data in a recording medium such as an optical disk. However, for simplicity, it is assumed

that the image has been recorded in the optical disk as the recording medium. Therefore, a block diagram in Fig. 1 shows, a so-called system exclusive for reproduction in which the image data already recorded at the presentation is successively reproduced by a remote controller.

[0011] Fig. 2 is a block diagram to show an configuration example of the reception circuit 9 in Fig. 1, and the identical reference numeral is given to components having the same function as that in Fig. 1. In Fig. 2, reference numeral 91 denotes a light receiving circuit to receive an infrared ray signal transmitted when the remote controllers 10a, 10b and 10c gives an order, reference numerals 92a, 92b and 92c denote a signal conversion circuit to convert the order of the infrared ray signal transmitted by the remote controller 10a, 10b and 10c into an order code to be interpreted by the CPU 1 of the presentation system. Reference numeral 92a denotes a signal conversion circuit exclusive for the remote controller 10a, reference numeral 92b denotes a signal conversion circuit exclusive for the remote controller 10b, and reference numeral 92c denotes a signal conversion circuit exclusive for the remote controller 10c, respectively, and each responds only to the order code transmitted by the corresponding remote controller. This can be easily realized by constituting a decoder so as to decode only the specified order code by

using an IC for versatile use. Reference numeral 93 denotes a command register to temporarily store the order code transmitted by the signal conversion circuits 92a, 92b and 92c, and reference numeral 94 denotes a bus interface (I/F) circuit to output the order code stored on a command register 93 on a system bus 5 according to the request of the CPU 1.

[0012] Fig. 3 is a block diagram to show a configuration example of the frame memory 7 in Fig. 1. Also, similar to Fig. 2, in this figure, identical reference numerals are given to the components having the same function as those in Fig. 1. In Fig. 3, reference numeral 71 denotes a memory for images to store the image data recorded in the optical disk, and in this figure, a picture displayed on the screen in practice is added for easy understanding. Reference numeral 72 denotes a memory for pointer to indicate a pointer movable by the remote controller, and as shown in the figure, the pointers 73a, 73b and 73c corresponding each remote controller are indicated on the screen. Reference numerals 74a, 74b and 74c denote pointer generating circuits to indicate and move the pointers 73a, 73b and 73c on the memory 72 for pointer, respectively. The circuits receive the output of the above-described signal conversion circuits 92a, 92b and 92c to move the pointers 73a, 73b and 73c.

[0013] Fig. 4 shows a configuration example of the pointer

generating circuit. This shows the configuration of the pointer generating circuit 74a corresponding to the remote controller 10a. The pointers 74b and 74c may also have a similar configuration.

[0014] In Fig. 4, reference numeral 741 denotes an address operation circuit, which calculates the address of the memory 72 for pointer to display the pointer 73a by the signal from the remote controller 10a input from the input terminal 77a. This can be realized by using an adding circuit or a counter. Reference numeral 742 denotes a ROM (a Read Only Memory) to record the data on the shape and the color of the pointer 73a. Reference numeral 743 denotes a circuit to write the pointer data read from the ROM 742 in the memory 72 for pointer according to the address input from the address operation circuit 741.

[0015] Further, in Fig. 3, reference numeral 75 denotes a synthesis circuit to synthesize and display an image of the memory 71 for image with the pointer image of the memory 72 for pointer. Reference numeral 76 denotes an output terminal to output the synthesized image to the display 8 shown in Fig. 1.

[0016] Next, a case of operating the presentation system will be explained. Here, a case will be explained, in which a presenter gives his presentation to other two persons. The presenter is defined as a first operator who has the

remote controller 10a. Further, the remaining two persons ask questions, and have the remote controllers 10b and 10c, respectively, and when asking questions, the remaining two persons become a second operator and a third operator, respectively. Each remote controller is capable of generating and transmitting individual signal codes, and not transmitting the same order code.

[0017] In the presentation system, the image can be displayed according to the data row describing the order for reproducing and outputting the image data in advance (hereinafter, referred to as a scenario), the scenario is prepared when the image data is prepared, and stored in the optical disk.

[0018] At the presentation, the first operator firstly starts the system. The CPU 1 interprets and executes the contents of the ROM 3, and is set in the initial condition and in a condition waiting for the order input of the remote controller 10a. The first operator selects the scenario by using the remote controller 10a, and orders the execution. The order output from the remote controller 10a is received by the reception circuit 9, and taken in the CPU 1 through the system bus 5.

[0019] The situation will be described with reference to Fig. 12. The order code output from the remote controller 10a by modulating the infrared ray beam is input in and

demodulated by the light receiving circuit 91, and output as the order code. The order code is input in the signal conversion circuits 92a, 92b and 92c. Since it is output by the remote controller 10a, only the signal conversion circuit 92a interprets (in other words, decodes) the content, converts it into the order executable by the CPU 1, and inputs the result of conversion in the command register 93. Even when the output of the light receiving circuit 91 is output in 92b and 92c, it is not interpreted as the order code, and no effective signal will be output from the signal conversion circuits 92b and 92c. When a plurality of orders are continuously input from the remote controller 10a, the order code is stored in the command register 93 according to the order.

[0020] In the waiting condition, the CPU 1 makes an access to the I/F circuit 94 of the reception circuit 9, successively takes in the orders from the oldest one stored in the command register 93 through the system bus 5, and starts execution. In other words, here, the optical disk device 4 is operated, the scenario written in the optical disk is copied to the main memory 2, and the first of the image data described in the scenario is read from the optical disk, and transferred to the frame memory 7.

[0021] In this condition, if the image is compressed, the data read from the optical disk device 4 is once transferred

to the compression/expansion circuit 6, returned to the original image through compression/expansion, and then, transferred to the frame memory 7. The image data stored in the frame memory 7 is displayed by the display 8. Thereafter, before a next order is input from the remote controller 10a, the CPU 1 is in a waiting condition, and continuously displays the first image.

[0022] The presenter, in other words, the first operator moves the pointer 73a by the remote controller 10a, instructs a desired point on the screen and gives description. Also for the operation of the pointer 73a, similar to the previous start of execution, only the order code of the remote controller 10a in the reception circuit 9 is interpreted and executed.

[0023] The pointer indication on the frame memory 7 in this situation will be described with reference to Fig. 3. As shown in Fig. 3, the pointer generating circuits 74a, 74b and 74c generate the pointers, and move the pointers 73a, 73b and 73c based on the signals input from the signal conversion circuits 92a, 92b and 92c. The pointer generating circuit 74a controls the pointer 73a to the order code given from the remote controller 10a. The pointers 73b and 73c do not move since no order is given to the pointer generating circuits 74b and 74c, and are fixed in an initial condition, for example, at the right and lower part of the

screen.

[0024] After the explanation, the first operator operates the remote controller 10a for displaying the next image, and gives an order again to the CPU 1 through the reception circuit 9. In the CPU 1, the scenario on the main memory 2 is referred to, the image data corresponding to the next page is read from the optical disk device 4, transferred to and displayed on the frame memory 7 in a waiting condition. By repeating the above-described operations, the first operator continues his presentation.

[0025] Next, in a case of questions and answers, the second and third operators who ask questions operate the pointers 73b and 73c by using the remote controllers 10b and 10c, respectively. In other words, the order given from the remote controller 10b is input in the light receiving circuit 91 in Fig. 2, and input in the signal conversion circuits 92a, 92b and 92c. However, in this case, the order code is given by the remote controller 10b, and interpreted only by the signal conversion circuit 92b, and the order code is output to the pointer generating circuit 74b through the output terminal 95b. In this situation, no output is made from the signal conversion circuits 92a and 92c. In Fig. 3, the pointer generating circuit 74b controls the pointer 73b, and the pointer is moved on the screen as operated by the second operator. Similarly in the case by

the third operator, the third operator operates the pointer 73c on the screen by using the remote controller 10c, and designates a specified point on the screen.

[0026] As described above, according to the present embodiment, a plurality of persons can operate their own pointer, and a condition does not occur, in which one pointer goes and comes back on the screen, and the presentation, a TV conference or the like can be smoothly advanced.

[0027] In the above-described description, the pointer data recorded in the ROM 742 of the pointer generating circuits 74a, 74b and 74c is completely same. Thus, the three pointers indicated on the screen are same in shape and color as shown in Fig. 3, raising a problem in that the operators hardly identify their own pointers. To solve the problem, the pointer data having different shapes and colors is recorded in the ROM 742 of the pointer generating circuits 74a, 74b and 74c. Description will be given below with reference to Fig. 5.

[0028] Fig. 5 is a schematic representation of another example of three pointers indicated on the screen. In other words, the pointer data to display a figure shown in Fig. 5(a) is recorded in the ROM 742 of the pointer generating circuit 74a shown in Fig. 4 as the pointer 73a for the remote controller 10a; the pointer data to display the

figure shown in Fig. 5(b) is recorded in the ROM of the pointer generating circuit 74b as the pointer 73b for the remote controller 10b; and the pointer data to display the figure shown in Fig. 5(c) is recorded in the ROM of the pointer generating circuit 74c as the pointer 73c for the remote controller 10c, respectively. Thus, by giving the shape or the color for the pointers exclusive for the pointers 73a, 73b and 73c, the pointer can be easily identified.

[0029] Further, in addition to the above-described method, a method may be used, in which an erasable and writable RAM (a random access memory) is used in place of the ROMs of the pointer generating circuits 74a, 74b and 74c. Hereafter, description thereof will be given with reference to Fig. 6. Fig. 6 is a block diagram to show another configuration example of the pointer generating circuit in Fig. 3. In Fig. 6, reference numeral 744 denotes a RAM used in place of the ROM 742 shown in Fig. 4, reference numeral 745 denotes an interface circuit to exchange the pointer data between the RAM 744 and the system bus 5.

[0030] In this configuration example, the CPU 1 writes the desired pointer data in the RAM 744 via the system bus 5, and the interface circuit 745 in advance. Thus, the pointer of the shape and the color according to the case by case can be freely indicated. Therefore, the pointer can be easily

identified, and an effective presentation will be achieved.

[0031] Further, in the above-described description, the remote controllers 10a, 10b and 10c generate and transmit their own order codes, but do not transmit the same order code, resulting in an inconvenience, in that the specified pointer can only be moved by the specified remote controller. To solve this, by providing the code selection switches on the remote controllers 10a, 10b and 10c, any desired pointer can be operated by any remote controller. This will be described below with reference to Fig. 7.

[0032] Fig. 7 is a block diagram to show another configuration example of the remote controller 10a in Fig. 1. Fig. 7 shows the configuration of the remote controller 10a. The remote controllers 10b and 10c have a similar configuration.

[0033] In Fig. 7, reference numeral 101 denotes an input circuit of the remote controller, which generally consists of a pushbutton of a matrix shape. The code selection generating circuit 102 receives the result of output of the input circuit 101, and selects and generates the order code. For this purpose, by using the ROM, the order code data may be output with the output of the input circuit 101 as the address of the ROM.

[0034] Here, all the order codes generated by the three remote controllers are stored in the code selection

generating circuit 102. Selection of these three kinds of codes can be performed by the code selection switch 103 and the decoder 107. In the code selection switch 103, the address of the ROM is changed by the decoder 107 so as to select in the code selection generating circuit 102 the order code of the remote controller 10a if the terminal 104 is selected in advance; the order code of the remote controller 10c if the terminal 105 is selected; and the order code of the remote controller 10c if the terminal 106 is selected, respectively.

[0035] Therefore, in this configuration, only by changing the code selection switch 103, the desired pointer can be operated, eliminating the inconvenience in that the specified pointer can be moved only by the specified remote controller.

[0036] Further, in the above-described description, when two or more operators simultaneously operate the pointer, two or more pointers are simultaneously moved on the screen, raising a problem in that confusion is given to the operators or the persons attending the conference. Thus, to solve the problem, a new circuit shown in Fig. 8 is added to the frame memory 7 shown in Fig. 3.

[0037] Fig. 8 is a block diagram to show a main part of another configuration example of the frame memory 7 shown in Fig. 1. In other words, in the configuration example shown

in Fig. 8, a circuit described below is provided in a path from the input terminals 77a, 77b and 77c to the pointer generating circuits 74a, 74b and 74c in the frame memory 7 shown in Fig. 3.

[0038] In Fig. 8, the same symbol is given to the components having the same function of those in Fig. 3. Reference numerals 11a, 11b and 11c denote a switch circuit, in which the control signal is closed at a high level, and opened at a low level to block the signal input from the input terminal a, 77b and 77c. Reference numerals 12a, 12b and 12c denote an input detection circuit to detect that the order code is input in the pointer generating circuits 74a, 74b and 74c, which outputs the signal at a high level if no order code is input, and outputs the signal at a low level when the input is detected. The order code is normally the pulse row, and can be realized if the pulse can be retained for a predetermined period if the pulse is input by using, for example, a multi-vibrator.

[0039] Reference numeral 13a denotes an AND circuit to receive the output signal of the input detection circuits 12b and 12c, reference numeral 13b denotes an AND circuit to receive the output signal of the input detection circuits 12a and 12c, and reference numeral 13c denotes an AND circuit to receive the output signal of the input detection circuits 12a and 12b, and each output is received by the

switch circuits 11a, 11b and 11c, respectively. Reference numerals 14a, 14b and 14c denote terminals for the output signal of the pointer generating circuits 74a, 74b and 74c, which are coupled with the memory 72 for pointer in Fig. 3 to write the pointer on the memory.

[0040] In the present configuration example, a case is described, in which, for example, the remote controller 10b is operated. Firstly, when the remote controllers 10a, 10b and 10c are not operated, the order code is not input in the input detection circuits 12a, 12b and 12c, and all the output signals are at a high level, and all the switch circuits 11a, 11b and 11c are closed.

[0041] Firstly, when the remote controller 10b is operated, the order code is input in the input terminal 77b. The order code is input in the input detection circuit 12b and the pointer generating circuit 4b. The input detection circuit 12b detects that the signal is input, and sets the output signal to be at a low level. Receiving the signal, the output signal becomes at a low level in the AND circuits 13a and 13c, the switch circuits 11a and 11c are opened, and subsequently, the order code is not received even if the order code is input in the input terminals 77a and 77c.

[0042] Thereafter, when the operation by the remote controller 10b is completed, the input detection circuit 12b sets its output signal to be at a high level again, and

closes the switch circuits 11a and 11c. Thus, the orders of the remote controllers 10a and 10c can be received.

[0043] As described above, according to the present configuration example, two or more pointers are not simultaneously moved on the screen, resulting in an advantage in that the operators and the persons attending the conference are not confused.

[0044] Further, in the above-described description, when the operator operates one pointer, and another pointer is indicated on the screen, the latter pointer may form an obstacle or an obtrusion. To solve this, a new circuit shown in Fig. 9 is added to the frame memory 7 shown in Fig. 3.

[0045] Fig. 9 is a block diagram to show a main part of another configuration example of the frame memory 7 in Fig. 1. In other words, in the configuration example shown in Fig. 9, the frame memory 7 shown in Fig. 3 has retaining circuits 15a, 15b and 15c in addition to a circuit shown in Fig. 8 in a path from the input terminals 77a, 77b and 77c to the pointer generating circuits 74a, 74b and 74c.

[0046] Here, the retaining circuits 15a, 15b and 15c input the output of the input detection circuits 12a, 12b and 12c, and the output of the logical circuits 13a, 13b and 13c. The retaining circuit 15a retains the output level of the input detection circuit 12a before the output of the other

input detection circuits 12b and 12c, in other words, the output of the logical product 13a is input, and similar to the other retaining circuits 15b and 15C, it retains the output level of the input detection circuits 12b and 12c. A flip-flop circuit or the like may be used for the retaining circuits 15a, 15b and 15c, which can be realized by setting the output of the input detection circuits 12a, 12b and 12c to be the clock input, and setting the output of the AND circuits 13a, 13b and 13c to be the reset input. The output of the retaining circuits 15a, 15b and 15c is input in the pointer generating circuits 74a, 74b and 74c.

[0047] The configuration of the pointer generating circuits 74a, 74b and 74c is basically unchanged from that shown in Fig. 4. However, the output signal of the retaining circuits 15a, 15b and 15c is coupled with the address signal input of the ROM 742. In the ROM 742, two kinds of the pointer data, i.e., the data to indicate the shape and the color of the pointer for the regular indication, and the pointer data capable of performing the indication with the reduced size so as to be less conspicuous on the screen when another pointer is operated is stored. The output signal of the above-described retaining circuits 15a, 15b and 15c is input as the address signal, and by changing the address, for example, at a low level, the former pointer, or at a high level, the latter pointer is respectively read.

[0048] Firstly, in the initial condition, the three retaining circuits 15a, 15b and 15c output the signal on a high level, and the pointer generating circuits 74a, 74b and 74c display the small pointer on the screen. Next, when the remote controller 10a is operated, the order code is input in the input detection circuit 12a, and the regular high level output is at a low level. The retaining circuit 15a receives the output of the input detection circuit 12a to output the signal on a low level, and input it in the pointer generating circuit 74a. The pointer generating circuit 74a changes the pointer indication to that of a regular size to easily indicate and see the pointer.

[0049] When the operation of the remote controller 10a is completed, the output of the input detection circuit 12a becomes on a high level again. However, the output of the retaining circuit 15a is kept unchanged to maintain the low level, and the size of the pointer is unchanged from the regular one. Next, when the remote controller 10b is operated, the order code is input in the input detection circuit 12b, and completely similar to a case in which the remote controller 10a is operated, the output signal of the retaining circuit 15b is changed from the high level to the low level. In this situation, the output of the input detection circuit 12b becomes at a low level, and as a result, the output of the AND circuit 13a is changed from

the high level to the low level, the signal is input in the pointer generating circuit 74a to reset the output signal, and the low level output is here changed to the high level output for the first time. Therefore, the size of the pointer of the remote controller 10b becomes regular, and at the same time, the size of the pointer of the remote controller 10a becomes small.

[0050] Therefore, according to the present configuration example, the size of the pointer becomes regular when the operator operates the pointer, and the pointers of the other operators are indicated smaller, forming no obstacle on the screen. The embodiments of the present invention are described above. Needless to say, the circuits of the input terminals 77a, 77b and 77c and subsequent ones in Fig. 3, Fig. 4, Fig. 6, Fig. 8 and Fig. 9 can be realized totally by the software by using, for example, a microcomputer exclusive for the pointer or the CPU 1 in place of an exclusive circuit.

[0051]

[Advantages] According to the present invention, a plurality of pointers are indicated on the screen, and each pointer can be independently operated. Therefore, the presentation or the TV conference with a plurality of persons participating therein can be advanced while each person uses his own pointer, and a smooth advancement can be

expected. Further, even when a plurality of pointers are indicated, the shape or the color of each pointer can be different from each other, each pointer can be easily identified, and less conspicuous if the pointer is unnecessary during the operation, resulting in no obstacle or obtrusion.

[Brief Description of the Drawings]

[Fig. 1] Fig. 1 is a block diagram to show an image display device having a pointer indicating device as a first embodiment of the present invention.

[Fig. 2] Fig. 2 is a block diagram to show a configuration example of a reception circuit 9 in Fig. 1.

[Fig. 3] Fig. 3 is a block diagram to show a configuration example of a frame memory 7 in Fig. 1.

[Fig. 4] Fig. 4 is a block diagram to show a configuration example of a pointer generating circuit 74a in Fig. 3.

[Fig. 5] Fig. 5 is a schematic representation to show another example of three pointers displayed on a screen.

[Fig. 6] Fig. 6 is a block diagram to show another configuration example of the pointer generating circuit 74a in Fig. 3.

[Fig. 7] Fig. 7 is a block diagram to show another configuration example of the remote controller 10a in Fig. 1.

[Fig. 8] Fig. 8 is a block diagram to show a main part of another configuration example of the frame memory 7 in Fig.

1.

[Fig. 9] Fig. 9 is a block diagram to show a main part of another configuration example of the frame memory 7 in Fig. 1.

[Reference Numerals]

7 ... frame memory, 9 ... reception circuit, 10a, 10b, 10c ... remote controller, 11a, 11b, 11c ... switch, 12a, 12b, 12c ... input detection circuit, 13a, 13b, 13c ... AND circuit, 15a, 15b, 15c ... retaining circuit, 72 ... memory for pointer, 74a, 74b, 74c .. pointer generating circuit, 91 ... light receiving circuit, 92a, 92b, 92c ... signal conversion circuit, 102 ... code selection generating circuit, 103 ... code selection switch, 107 ... decoder

FIG. 1

2 MAIN MEMORY

4 OPTICAL DISK DEVICE

5 SYSTEM BUS

6 COMPRESSION/EXPANSION CIRCUIT

8 DISPLAY

7 FRAME MEMORY

9 RECEPTION CIRCUIT

10a, 10b, 10c REMOTE CONTROLLER

FIG. 2

5 SYSTEM BUS

9 RECEPTION CIRCUIT

91 LIGHT RECEIVING CIRCUIT

92a SIGNAL CONVERSION CIRCUIT

92b SIGNAL CONVERSION CIRCUIT

92c SIGNAL CONVERSION CIRCUIT

93 COMMAND REGISTER

94 I/F CIRCUIT

95a, 95b, 95c OUTPUT TERMINAL

FIG. 3

5 SYSTEM BUS

72 MEMORY FOR POINTER

71 MEMORY FOR IMAGE

77a, 77b, 77c INPUT TERMINAL

7 FRAME MEMORY

74a, 74b, 74c POINTER GENERATING CIRCUIT

73a POINTER FOR REMOTE CONTROLLER 10A

73b POINTER FOR REMOTE CONTROLLER 10B

73c POINTER FOR REMOTE CONTROLLER 10C

75 SYNTHESIS CIRCUIT

76 OUTPUT TERMINAL

FIG. 4

77a INPUT TERMINAL

74a POINTER GENERATING CIRCUIT

741 ADDRESS OPERATION CIRCUIT

743 WRITE CIRCUIT

FIG. 5

(a) INDICATED FIGURE OF POINTER 73a

(b) INDICATED FIGURE OF POINTER 73b

(c) INDICATED FIGURE OF POINTER 73c

FIG. 6

77a INPUT TERMINAL

741 ADDRESS OPERATION CIRCUIT

743 WRITE CIRCUIT

74a POINTER GENERATING CIRCUIT

*** TO SYSTEM BUS

FIG. 7

10a REMOTE CONTROLLER

101 INPUT CIRCUIT (MATRIX SHAPED PUSHBUTTON)

102 CODE SELECTION AND GENERATING CIRCUIT (ROM)

** ADDRESS LINE

107 DECODER

103 CODE SELECTION SWITCH

108 MODULATION CIRCUIT

109 LIGHT EMITTING CIRCUIT

FIG. 8

77a INPUT TERMINAL

77b INPUT TERMINAL

77c INPUT TERMINAL

12a INPUT DETECTION CIRCUIT

12b INPUT DETECTION CIRCUIT

12c INPUT DETECTION CIRCUIT

74a POINTER GENERATING CIRCUIT

74b POINTER GENERATING CIRCUIT

74c POINTER GENERATING CIRCUIT

14a OUTPUT TERMINAL

14b OUTPUT TERMINAL

14c OUTPUT TERMINAL

FIG. 9

77a INPUT TERMINAL

77b INPUT TERMINAL

77c INPUT TERMINAL

12a INPUT DETECTION CIRCUIT

12b INPUT DETECTION CIRCUIT

12c INPUT DETECTION CIRCUIT

15a RETAINING CIRCUIT

15b RETAINING CIRCUIT

15c RETAINING CIRCUIT

74a POINTER GENERATING CIRCUIT

74b POINTER GENERATING CIRCUIT

74c POINTER GENERATING CIRCUIT

14a OUTPUT TERMINAL

14b OUTPUT TERMINAL

14c OUTPUT TERMINAL